

FILE COPY

10/050,593

DLG

Set	Items	Description
S1	20167	RHIZOBIA OR RHIZOBIAL
S2	107450	LEGUME OR LEGUMINOUS
S3	5264	S1 AND S2
S4	4	S3 AND HERBICIDE(W)RESISTANT
S5	4	RD S4 (unique items)
S6	4	S5 NOT PY>2001
S7	24	S3 AND (SUPERIOR(N5)NITROGEN(N5)(FIXING OR FIXATION))
S8	7	RD S7 (unique items)
S9	6	S8 NOT PY>2001

6/3/1 (Item 1 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci
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03672443 Genuine Article#: PW772 No. References: 46
Title: INSECTICIDAL ACTIVITY AND COMPETITIVENESS OF RHIZOBIUM SPP
CONTAINING THE BACILLUS-THURINGIENSIS SUBSP TENEBRIONIS DELTA-ENDOTOXIN
GENE (CRYIII) IN **LEGUME** NODULES
Author(s): BEZDICEK DF; QUINN MA; FORSE L; HERON D; KAHN ML
Corporate Source: WASHINGTON STATE UNIV,DEPT CROP & SOIL
SCI/PULLMAN//WA/99164; USDA,ANIM & PLANT HLTH INSPECT
SERV/HYATTSVILLE//MD/20782; WASHINGTON STATE UNIV,INST BIOL CHEM,DEPT
MICROBIOL/PULLMAN//WA/99164
Journal: SOIL BIOLOGY & BIOCHEMISTRY, 1994, V26, N12 (DEC), P1637-1646
ISSN: 0038-0717
Language: ENGLISH Document Type: ARTICLE (Abstract Available)

6/3/2 (Item 2 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci
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03615806 Genuine Article#: PR206 No. References: 50
Title: ENOD40, A GENE EXPRESSED DURING NODULE ORGANOGENESIS, CODES FOR A
NONTRANSLATABLE RNA INVOLVED IN PLANT-GROWTH
Author(s): CRESPI MD; JURKEVITCH E; POIRET M; DAUBENTONCARAFA Y; PETROVICS
G; KONDOROSI E; KONDOROSI A
Corporate Source: CNRS,INST SCI VEGETALES/F-91198 GIF SUR YVETTE//FRANCE//;
CNRS,INST SCI VEGETALES/F-91198 GIF SUR YVETTE//FRANCE//; CNRS,CTR GENET
MOLEC/F-91198 GIF SUR YVETTE//FRANCE//; HUNGARIAN ACAD SCI,BIOL RES
CTR,INST GENET/H-6701 SZEGED//HUNGARY//
Journal: EMBO JOURNAL, 1994, V13, N21 (NOV 1), P5099-5112
ISSN: 0261-4189
Language: ENGLISH Document Type: ARTICLE (Abstract Available)

6/3/3 (Item 3 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci
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03503682 Genuine Article#: PH746 No. References: 47
Title: THE EFFECT OF TOXIN-PRODUCING RHIZOBIUM STRAINS, ON LARVAE OF
SITONA-FLAVESCENS FEEDING ON **LEGUME** ROOTS AND NODULES
Author(s): SKOT L; TIMMS E; MYTTON LR
Corporate Source: AFRC,INST GRASSLAND & ENVIRONM RES,PLAS
GOWERDDAN/ABERYSTWYTH SY23 3EB/DYFED/WALES/
Journal: PLANT AND SOIL, 1994, V163, N1 (JUN), P141-150
ISSN: 0032-079X
Language: ENGLISH Document Type: ARTICLE (Abstract Available)

6/3/4 (Item 1 from file: 357)
DIALOG(R)File 357:Derwent Biotech Res.
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0055319 DBA Accession No.: 86-13167 PATENT
Herbicide resistant Rhizobium production - by repeatedly
treating with herbicide solution, inoculating leguminosae seeds, sowing
and isolating
PATENT ASSIGNEE: Takarmanytermesztes. 1986
PATENT NUMBER: HU T038598 PATENT DATE: 860630 WPI ACCESSION NO.:
86-214188 (8633)
PRIORITY APPLIC. NO.: HU 833617 APPLIC. DATE: 831019
NATIONAL APPLIC. NO.: HU 833617 APPLIC. DATE: 831019

LANGUAGE: Hungarian

? t s6/k/1-4

>>>KWIC option is not available in file(s): 41, 77, 399

6/K/1 (Item 1 from file: 34)

DIALOG(R)File 34:(c) 2002 Inst for Sci Info. All rts. reserv.

...Title: COMPETITIVENESS OF RHIZOBIUM SPP CONTAINING THE
BACILLUS-THURINGIENSIS SUBSP TENEBRIONIS DELTA-ENDOTOXIN GENE (CRYIII)
IN **LEGUME** NODULES

...Abstract: utilization or a conditional nifH promoter that is involved in
nitrogen fixation. The cryIII-containing **rhizobia** (i.e.
C1-pBtt-LZ and C1-pBtt-nH) expressed toxin in sufficient quantities
within...

...Pisum sativum and Sitona hispidulus on Medicago sativa. The pRK311
plasmid remained stable in the **rhizobia** that were either
free-living or within nodules of the legumes. The engineered
cryIII-containing...

...Research Fronts: 006 (MICROPROJECTILE BOMBARDMENT; TRANSGENIC RICE
(ORYZA-SATIVA L) PLANTS; INSECTICIDAL CRYSTAL PROTEIN GENE; STABLY
TRANSFORMED **HERBICIDE RESISTANT** CALLUS)

92-4812 001 (PUTATIVE ANAEROBIC COPROPORPHYRINOGEN-III OXIDASE IN
RHODOBACTER-SPHAEROIDES; TRANSCRIPTIONAL REGULATORY ELEMENT...)

6/K/2 (Item 2 from file: 34)

DIALOG(R)File 34:(c) 2002 Inst for Sci Info. All rts. reserv.

...Abstract: inducing root nodules. However, certain Medicago plants can
form nodules spontaneously, in the absence of **rhizobia**. A
differential screening was performed using spontaneous nodule versus
root cDNAs from Medicago sativa ssp...

...Research Fronts: INDUCIBLE NODULATION GENES; RHIZOBIUM-LEGUMINOSARUM
BIOVAR VICIAE; PEA ROOT NODULE DEVELOPMENT; AUXIN TRANSPORT; MOLECULAR
SIGNALS; **LEGUME SYMBIOSIS**)

92-0805 001 (MICROPROJECTILE BOMBARDMENT; TRANSGENIC RICE (ORYZA-SATIVA
L) PLANTS; INSECTICIDAL CRYSTAL PROTEIN GENE; STABLY TRANSFORMED
HERBICIDE RESISTANT CALLUS)

92-4812 001 (PUTATIVE ANAEROBIC COPROPORPHYRINOGEN-III OXIDASE IN
RHODOBACTER-SPHAEROIDES; TRANSCRIPTIONAL REGULATORY ELEMENT...)

6/K/3 (Item 3 from file: 34)

DIALOG(R)File 34:(c) 2002 Inst for Sci Info. All rts. reserv.

Title: THE EFFECT OF TOXIN-PRODUCING RHIZOBIUM STRAINS, ON LARVAE OF
SITONA-FLAVESCENS FEEDING ON **LEGUME** ROOTS AND NODULES

Abstract: Larvae of the weevil Sitona spp. specifically eat the root
nodules formed on **legume** plants by the soil bacterium Rhizobium,
This can adversely affect the nitrogen fixing activity in the root
nodules and lead to decreases in yield. Transgenic **rhizobia** were
used in a novel approach to the biological control of Sitona. Two
transcriptional fusions...

...larvae of Sitona flavescens, In both white clover and pea plants
nodulated by the transgenic **rhizobia** a slightly smaller
proportion of root nodules were damaged compared to the wild type
control...

...Research Fronts: 002 (MICROPROJECTILE BOMBARDMENT; TRANSGENIC RICE
(ORYZA-SATIVA L) PLANTS; INSECTICIDAL CRYSTAL PROTEIN GENE; STABLY
TRANSFORMED **HERBICIDE RESISTANT** CALLUS)

92-4812 002 (PUTATIVE ANAEROBIC COPROPORPHYRINOGEN-III OXIDASE IN
RHODOBACTER-SPHAEROIDES; TRANSCRIPTIONAL REGULATORY ELEMENT...)

...INDUCIBLE NODULATION GENES; RHIZOBIUM-LEGUMINOSARUM BIOVAR VICIAE; PEA
ROOT NODULE DEVELOPMENT; AUXIN TRANSPORT; MOLECULAR SIGNALS;
LEGUME SYMBIOSIS)
92-3056 001 (UPTAKE OF SURFACTANT PROTEIN-B; CASEIN KINASE-II;
CATALYTIC SUBUNITS)
92...

6/K/4 (Item 1 from file: 357)
DIALOG(R)File 357:(c) 2002 Thomson Derwent & ISI. All rts. reserv.

Herbicide resistant Rhizobium production

ABSTRACT: **Rhizobia** with good herbicide tolerance are prepared by (1) isolating **Rhizobium** varieties from the live root tissue of selected high-nitrogen binding leguminosae, (2) treating the **Rhizobia** with herbicides normally used during the cultivation of leguminosae and other important crops like wheat and maize, (3) inoculating a synthetic mixture of the most important leguminosae with the **Rhizobia** surviving the herbicide treatment and (4) sowing the seeds of the inoculated leguminosae into seed trays containing soil which has never grown soybeans. **Rhizobia** are isolated from the roots of resulting plants. Preferably, the process is repeated 3-4 times with increasing herbicide concentrations. The process is finally scaled up to fields, the resulting **Rhizobia** being mixed with herbicide solutions and applied to the soil.

DESCRIPTORS: Rhizobium generation with improved herbicide resistance, strain improvement, nitrogen-fixation, **legume** bacterium pesticide resistance plant

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9/3/1 (Item 1 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)
(c) 2002 BIOSIS. All rts. reserv.

10138901 BIOSIS NO.: 199698593819
Preference in the nodulation of *Phaseolus vulgaris* cultivar RAB39.
AUTHOR: Montealegre C; Graham P H(a); Kipe-Nolt J A
AUTHOR ADDRESS: (a)Rhizobium Res. Lab., Dep. Soil Water Climate, Univ.
Minnesota, St. Paul, MN 55108**USA
JOURNAL: Canadian Journal of Microbiology 41 (11):p992-998 1995
ISSN: 0008-4166
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: English

9/3/2 (Item 2 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)
(c) 2002 BIOSIS. All rts. reserv.

10007328 BIOSIS NO.: 199598462246
Manipulation of *rhizobia* microflora for improving legume
productivity and soil fertility: A critical assessment.
AUTHOR: Brockwell John(a); Bottomley Peter J; Thies Janice E
AUTHOR ADDRESS: (a)CSIRO Div. Plant Ind., GPO Box 1600, Canberra, ACT 2601
**Australia
JOURNAL: Plant and Soil 174 (1-2):p143-180 1995
ISSN: 0032-079X
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: English

9/3/3 (Item 3 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)
(c) 2002 BIOSIS. All rts. reserv.

08265406 BIOSIS NO.: 000094046579
POTENTIAL FOR INCREASING NITROGEN FIXATION IN GRAIN LEGUMES
AUTHOR: BUTTERY B R; PARK S J; HUME D J
AUTHOR ADDRESS: AGRIC. CANADA RES. STATION, HARROW, ONT. N0R 1G0, CAN.
JOURNAL: CAN J PLANT SCI 72 (2). 1992. 323-349. 1992
FULL JOURNAL NAME: Canadian Journal of Plant Science
CODEN: CPLSA
DOCUMENT TYPE: Review
RECORD TYPE: Abstract
LANGUAGE: ENGLISH

9/3/4 (Item 1 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci
(c) 2002 Inst for Sci Info. All rts. reserv.

01974535 Genuine Article#: JQ929 No. References: 238
Title: GENETICS OF COMPETITION FOR NODULATION OF LEGUMES
Author(s): TRIPPLETT EW; SADOWSKY MJ
Corporate Source: UNIV WISCONSIN, DEPT AGRON/MADISON//WI/53706; UNIV
WISCONSIN, CTR STUDY NITROGEN FIXAT/MADISON//WI/53706; UNIV
MINNESOTA, DEPT SOIL SCI/ST PAUL//MN/55108; UNIV MINNESOTA, DEPT
MICROBIOL/ST PAUL//MN/55108
Journal: ANNUAL REVIEW OF MICROBIOLOGY, 1992, V46, P399-428
ISSN: 0066-4227
Language: ENGLISH Document Type: REVIEW (Abstract Available)

9/3/5 (Item 1 from file: 76)
DIALOG(R)File 76:Life Sciences Collection
(c) 2002 Cambridge Sci Abs. All rts. reserv.

00644692 0460822

Field evaluation of selected Rhizobium in an improved legume inoculant.

Kremer, R.J.; Peterson, H.L.

Dep. Agron., Univ. Missouri, Columbia, MO 65201, USA

AGRON. J. vol. 75, no. 1, pp. 139-143 (1983.)

DOCUMENT TYPE: Journal article LANGUAGE: ENGLISH

SUBFILE: Microbiology Abstracts Section B: Bacteriology; Microbiology Abstracts Section A: Industrial and Applied Microbiology

9/3/6 (Item 1 from file: 98)

DIALOG(R)File 98:General Sci Abs/Full-Text

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03790963 H.W. WILSON RECORD NUMBER: BGSI98040963 (USE FORMAT 7 FOR FULLTEXT)

Legumes may be symbiont-limited during old-field succession.

Larson, Jennifer L

Siemann, Evan

The American Midland Naturalist (Am Midl Nat) v. 140 no1 (July '98) p. 90-5

SPECIAL FEATURES: bibl il ISSN: 0003-0031

LANGUAGE: English

COUNTRY OF PUBLICATION: United States

WORD COUNT: 2057

?

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AUTHOR ADDRESS: (a)Rhizobium Res. Lab., Dep. Soil Water Climate, Univ.
Minnesota, St. Paul, MN 55108**USA
JOURNAL: Canadian Journal of Microbiology 41 (11):p992-998 1995
ISSN: 0008-4166
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9/3/2 (Item 2 from file: 5)
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productivity and soil fertility: A critical assessment.
AUTHOR: Brockwell John(a); Bottomley Peter J; Thies Janice E
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JOURNAL: CAN J PLANT SCI 72 (2). 1992. 323-349. 1992
FULL JOURNAL NAME: Canadian Journal of Plant Science
CODEN: CPLSA
DOCUMENT TYPE: Review
RECORD TYPE: Abstract
LANGUAGE: ENGLISH

9/3/4 (Item 1 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci
(c) 2002 Inst for Sci Info. All rts. reserv.

01374535 Genuine Article#: JQ92C No. References: 238
Title: GENETICS OF COMPETITION FOR NODULATION OF LEGUMES
Author(s): TRIPLETT EW; SADOWSKY MJ
Corporate Source: UNIV WISCONSIN, DEPT AGRON/MADISON//WI/53706; UNIV
WISCONSIN, CTR STUDY NITROGEN FIXAT/MADISON//WI/53706; UNIV
MINNESOTA, DEPT SOIL SCI/ST PAUL//MN/55108; UNIV MINNESOTA, DEPT
MICROBIOL/ST PAUL//MN/55108
Journal: ANNUAL REVIEW OF MICROBIOLOGY, 1992, V46, P399-428
ISSN: 0066-4227
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9/3/5 (Item 1 from file: 76)
DIALOG(R)File 76:Life Sciences Collection
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Field evaluation of selected *Rhizobium* in an improved **legume** inoculant.

Kremer, R.J.; Peterson, H.L.

Dep. Agron., Univ. Missouri, Columbia, MO 65201, USA

AGRON. J. vol. 75, no. 1, pp. 139-143 (1983.)

DOCUMENT TYPE: Journal article LANGUAGE: ENGLISH

SUBFILE: Microbiology Abstracts Section B: Bacteriology; Microbiology Abstracts Section A: Industrial and Applied Microbiology

9/3/6 (Item 1 from file: 98)

DIALOG(R)File 98:General Sci Abs/Full-Text

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03790963 H.W. WILSON RECORD NUMBER: BGSI98040963 (USE FORMAT 7 FOR FULLTEXT)

Legumes may be symbiont-limited during old-field succession.

Larson, Jennifer L

Siemann, Evan

The American Midland Naturalist (Am Midl Nat) v. 140 no1 (July '98) p. 90-5

SPECIAL FEATURES: bibl 11 ISSN: 0003-0031

LANGUAGE: English

COUNTRY OF PUBLICATION: United States

WORD COUNT: 2057

? t s9/k/1-6

>>>KWIC option is not available in file(s): 41, 77, 399

9/K/1 (Item 1 from file: 5)

DIALOG(R)File 5:(c) 2002 BIOSIS. All rts. reserv.

ABSTRACT: The low nodule occupancy achieved by **superior** **nitrogen-fixing** inoculant strains is a problem in the production of many traditional **legume** species, including *Phaseolus vulgaris*. Cultivars that select for inoculant strains, rather than nodulate with ineffective indigenous **rhizobia**, offer one approach to the resolution of this problem. In this study we identify a...

9/K/2 (Item 2 from file: 5)

DIALOG(R)File 5:(c) 2002 BIOSIS. All rts. reserv.

Manipulation of **rhizobia** microflora for improving **legume** productivity and soil fertility: A critical assessment.

...ABSTRACT: augmented as the world's population increases and as the natural resources that supply fertilizer **nitrogen** diminish. This objective will be achieved through the development of **superior** **legume** varieties, improvement in agronomic practice, and increased efficiency of the **nitrogen fixation** process itself by better management of the symbiotic relationship between plant and bacteria. This paper...

...nodule bacteria, established and introduced, can be manipulated ecologically, agronomically, edaphically and genetically to improve **legume** productivity and, as a consequence, soil fertility.

MISCELLANEOUS TERMS: ...**LEGUMINOUS TREES**...

...RHIZOBIAL ECOLOGY...

...RHIZOBIAL GENETICS

9/K/3 (Item 3 from file: 5)
DIALOG(R)File 5:(c) 2002 BIOSIS. All rts. reserv.

...ABSTRACT: review considers the main factors determining the level of nitrogen fixation in the major grain-legume crops (chickpea, common bean, cowpea, faba bean, lentil, pea, peanut, pigeon pea and soybean) and ...

...various crops to both the addition of nitrogen fertilizer and inoculation with effective strains of **rhizobia** are discussed. The present situation and future prospects for increasing **nitrogen fixation** through plant breeding, development of **superior** strains, **superior** host-strain combinations, improved inoculation techniques, bioengineering and other non-traditional methods are discussed. The...

9/K/4 (Item 1 from file: 34)
DIALOG(R)File 34:(c) 2002 Inst for Sci Info. All rts. reserv.

Abstract: An economically important problem in microbial ecology concerns the efficacy of **rhizobial** inoculants for the formation of nitrogen-fixing root nodules on **legume** crop plants such as soybean, alfalfa, and clover. Some strains of **rhizobia** can increase symbiotic nitrogen fixation under controlled conditions. However, attempts to improve nitrogen fixation under...

...conditions with such strains often fail, usually as a result of the presence of indigenous **rhizobia** limiting nodulation by the inoculum strains. This problem is referred to as the Rhizobium competition...

...is being used to address the problem from two perspectives. First, the host specificity of **rhizobia** is being characterized with the long term goal of developing strains that can nodulate a very strain-specific host-legume genotype. Second, the genetic basis of competitiveness in several strains is being examined. Genetic determinants...

...nodulation competitiveness have been isolated and mechanisms for their stable integration into the genome of **superior nitrogen-fixing** strains have been developed. Several phenotypes have been identified as playing an important role in...

9/K/5 (Item 1 from file: 76)
DIALOG(R)File 76:(c) 2002 Cambridge Sci Abs. All rts. reserv.

Field evaluation of selected Rhizobium in an improved **legume** inoculant.

Increased grain **legume** production depends on effective symbiotic di-nitrogen fixation through successful **legume** inoculation. Inoculants containing high numbers (greater than or equal to 10 super(7)/g) of...

...must withstand adverse field conditions. Field studies were performed to determine the effects of selected **rhizobia** in two different inoculant carriers on nodulation and performance of three grain legumes. The

experiments...

...of effective Rhizobium at planting. Through subsequent effective nodulation, oil-base inoculants increased yields and **nitrogen fixation** by the legumes due to increased nodulation by the **superior N sub(2)-fixing strains of Rhizobium**.

9/K/6 (Item 1 from file: 98)
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(USE FORMAT 7 FOR FULLTEXT)

...ABSTRACT: be rare throughout secondary succession in nitrogen-poor grasslands due to a lack of suitable **rhizobia** and consequently lower growth rates. Reprinted by permission of the publisher.

TEXT:

... soil nitrogen concentration increases (Gorham et al., 1979; Inouye et al., 1987). At low soil **nitrogen** concentrations, **nitrogen-fixing** legumes can be competitively **superior** to nonlegumes. However, studies at Cedar Creek have found that legumes are always rare and ...

...effect. They may also be at a competitive disadvantage due to a lack of compatible **rhizobia** that limit the formation of nodules.

Rhizobia differ in their ability to infect different species of plants (Berger et al., 1984; Paul...

...abandonment of a field previously planted with soybeans, there may initially be an abundance of **rhizobia**. Through time, the numbers of these **rhizobia** may decline if their corresponding symbiont is not present (Paul and Clark, 1989; Kucey and...

...the ability of soybeans to form nodules will decrease with time since last cultivation. Because **rhizobia** for native legumes may come from accumulation of **rhizobia** in the plant-root environment of colonizing legumes (Weaver et al., 1971), we hypothesized that the number of nodules on roots of native prairie **legume** seedlings may increase with time since abandonment. In order to estimate the nodulation potential of...

...successional stages, we used a bioassay employing *Lespedeza capitata* (bush clover, a common native prairie **legume** at Cedar Creek) seeds and soybean seeds.

MATERIALS AND METHODS

This work was performed with...

...Because legumes were rare in these fields, this eliminated the bias from sampling at a **legume** but may have biased our **rhizobia** abundance estimates to be slightly too low.

Before planting, the *Lespedeza* and soybean seeds were surface sterilized to reduce **rhizobia** numbers from the seed surface, and scarified to increase the germination of the seeds using...

...3 .

DISCUSSION

We used nodule number as an indicator of the relative abundance of compatible **rhizobia** in the soil through succession. The number of nodules per soybean plant decreased significantly with...

...younger fields, especially those previously planted with soybeans, one

might expect a greater number of **rhizobia** compatible with soybean seedlings (*Bradyrhizobium japonicum*, Bergey et al., 1984) than ...with soybeans. Our regression results suggest that only half as many of these soybean compatible **rhizobia** are left in the soil after 30-40 yr.

The opposite might be expected with *Lespedeza*, which are incompatible with soybean **rhizobia** (Bergey et al., 1984); older fields would have more **rhizobia** compatible with *Lespedeza* (a promiscuous *Bradyrhizobium* species, Bergey et al., 1984) due to their accumulation in the soil over time with the continued presence of the corresponding **legume**(s). We found a low number of nodules on plants grown in soil from young... numbers in soils from older fields suggest that older fields may be poor environments for **rhizobia** or nodulation.

Controlling for the relationship between number of nodules and *Lespedeza* plant size, *Lespedeza*...

...Putten et al., 1993). These factors, together with the low abundances of compatible and effective **rhizobia** in early succession, may limit the rate of succession on nutrient-poor soils by limiting...

...poor soil. *Ecology*, 76:2648-2655.

SOMASEGARAN, P. AND H. J. HOBEN. 1994. *Handbook for rhizobia: methods in legume and rhizobium technology*. Springer-Verlag, New York. 450 p.

TILMAN, D. 1982. Resource competition and...

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